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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

ROUTEMAN, BAKERY PRODUCTS (ret. tr.; whole tr.) 1-80.06

B-468 or S-197

U. S. Employment Service in
Cooperation with
Pennsylvania State Employment Service

September 1962

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

ROUTEMAN, BAKERY PRODUCTS 1-80.06

B-468 or S-197

Summary

The General Aptitude Test Battery, B-1002A, was administered to a sample of 52 males employed as Routeman, Bakery Products 1-80.06 at the Schulz Bakery, Pottstown, Pennsylvania. The criterion consisted of supervisory ratings prepared by the Sales Manager of the company. On the basis of mean scores, standard deviations, job analysis data and their combined selective efficiency. Aptitudes G-Intelligence, N-Numerical, and Q-Clerical Perception were selected for inclusion in the test norms.

GATB Norms for Routeman, Bakery Products 1-80.06 B-468 or S-197

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Routeman, Bakery Products 1-80.06.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-468 or S-197

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	100	G	Part 3 Part 4 Part 6	95
N	CB-1-I CB-1-D	105	N	Part 2 Part 6	100
Q	CB-1-B	85	Q	Part 1	85

Effectiveness of Norms

The data in Table V indicate that 10 of the 17 poor workers, or 59 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 59 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection progress. Moreover, 25 of the 32 workers who made qualifying test scores, or 78 percent, were good workers.

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Routeman, Bakery Products 1-80.06.

II. Sample

The General Aptitude Test Battery, B-1002A, was administered on March 24 and 31, 1954, to a sample of 54 males employed as Routeman, Bakery Products 1-80.06 at the Schulz Bakery, Pottstown, Pennsylvania. This sample included all of the males employed on this job. The data for two males over 60 years of age were omitted, which left a final sample of 52 males. Each worker is given on the job training lasting from 10 to 30 days.

There are no age requirements used in selection of the individuals in the sample for employment but completion of 8 years of education was considered as desirable. The selection of individuals for employment is made by the Personnel Manager through a personal interview.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 52

	M	σ	Range	r
Age (years)	32.4	7.1	19-46	-.021
Education (years)	11.1	1.8	6-15	.198
Experience (months)	71.1	58.7	1-189	.075

** Significant at the .01 level
* Significant at the .05 level

There is no significant correlation between age, education, or experience and the criterion. The data in table II indicate that the sample is suitable for test development purposes with respect to age, education and experience.

III. Job Description

Job Title: Routeman, Bakery Products (ret. tr.; whole tr.) 1-80.06

Job Summary: Delivers, sells and collects for bakery products by covering a retail or wholesale route in an assigned area. Prepares order blanks to indicate products and number needed. Checks items against order slips and loads truck according to sequence of deliveries and size of containers.

Work Performed: Prepares to make deliveries: Counts baked goods against order slips for bread, cakes, and stock items to ascertain that all items ordered are accounted for. Assembles load at edge of platform to facilitate loading by using a dolly and a wheeled metal rack. Secures truck from garage and backs up to loading platform. Loads truck according to sequence of deliveries and size of containers.

Delivers bakery products: Drives truck to houses and business establishments in assigned area.

Enters establishments of wholesale customer to determine the quantities of each product left over from the previous day and to solicit new business. Ascertains amounts of bakery products required to replenish customer's usual stock. Returns to truck and selects and carries required items into establishment. Arranges products on shelves or racks to display merchandise in an attractive manner. Prepares itemized bill, presents original to proprietor for checking and cash payment or signature. Accepts any approved bills to be turned into office for billing. Carries out stale products, if any, to truck for return to bakery.

Stops at homes of retail customers to sell bakery products. Arranges variety of products in basket to interest customers in purchasing additional items. Walks to door and rings bell or calls "Baker" to get attention. Suggests various sweet items in an effort to induce customer to buy. Collects payment for items purchased, or makes book entry showing amount of purchase. Adds that amount to balance due or makes a check to show a cash sale, which in either case is an indication to a relief driver that the customer buys regularly.

Makes settlement: Returns truck to bakery and enters Drivers Room to make settlement for the day and prepare future loading order. Computes separate amounts for bread, rolls, cakes, pies, and sweet goods by multiplying the number received by the wholesale or retail price of the product. Checks figures obtained with Cashier to determine if these figures agree with those with which the Cashier has charged him. Records entries on settlement sheet to show charges for products received and credits for goods sold or returned. Gives completed settlement sheet together with cash, checks, and authorized credit slips to Cashier.

Prepares own orders: Prepares order blanks to indicate the products and the number of each needed two days later. Consults order book to determine the number of each product ordered for the corresponding day of the previous week; deducts the number of products returned from that number; determines whether any conditions exist which might increase or decrease sales and adds or subtracts the required number in view of this determination; records the number of each product desired on the order blank; turns over order blank to supervisor.

IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of rank order ratings prepared by the Sales Manager. These ratings were converted to linear scores. Data were also collected on the earnings of the Routeman over a six month period. An obstacle to the use of earning as the criterion for a study of this type is that the various routes are not equated with respect to the potential for sales. For this reason, it was decided to use the supervisory ratings as the final criterion.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Intelligence (G) - to make decisions concerning the best route to use in order to reach customers with special time of delivery requests; to make decisions relative to allowing credit and dates of collection, based on pay days, preference or other factors.

Manual Dexterity (M) - to assemble merchandise on loading platform and to load these items on delivery truck.

Numerical Aptitude (N) - to determine amounts to be ordered on basis of figures for previous sales and returns; to bill customers and collect payments; to compute day's sales and to work up settlement sheet.

Clerical Perception (Q) - to check amount ordered against amount on rack or pile for loading; note quantities ordered and to check totals outstanding; to prepare bills, settlement sheets and perform related clerical duties.

On the basis of the job analysis data, none of the aptitudes were considered obviously unimportant for performing the duties of this job. Therefore, there were no "irrelevant" aptitudes.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 52

Aptitudes	M	σ	r
G-Intelligence	102.1	14.7	.142
V-Verbal Aptitude	96.5	14.1	.128
N-Numerical Aptitude	108.0	15.4	.104
S-Spatial Aptitude	99.9	21.1	.147
P-Form Perception	103.0	17.9	-.022
Q-Clerical Perception	103.3	13.9	.031
K-Motor Coordination	114.0	17.3	.181
F-Finger Dexterity	103.1	20.5	.079
M-Manual Dexterity	116.7	16.7	.048

**Significant at the .01 level
*Significant at the .05 level

Aptitudes N, K and M have the highest mean scores and aptitudes G, V and Q have relatively low standard deviations. For a sample of 52 cases, correlations of .354 and .273 are significant at the .01 level and the .05 level of confidence, respectively. There were no significant correlations between any of the aptitudes and the criterion.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X		X			X			X
Irrelevant									
Relatively High Mean			X				X		X
Relatively Low Sigma	X	X				X			
Significant Correlation with Criterion									
Aptitudes to be considered for trial norms	G		N			Q			M

Trial norms consisting of various combinations of Aptitudes G, N, Q and M with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of G-95, N-100, and Q-85 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 42 was used and resulted in 17 of the workers or 33 percent of the sample being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes G, N, and Q with critical scores of 95, 100 and 85 respectively, and the dichotomized criterion for Routeman, Bakery Products 1-80.06. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for Routeman, Bakery Products 1-80.06

(G-95, N-100, Q-85)

N = 52

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	10	25	35
Poor Workers	10	7	17
Total	20	32	52

$r_{tet} = .47$ $\quad X^2 = 3.239$

$\sigma_{r_{tet}} = .23$ $\quad P/2 < .05$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, N, and Q with minimum scores of 95, 100 and 85 respectively, have been established as B-1002 norms for the occupation of Routeman, Bakery Products 1-80.06. The equivalent B-1001 norms consist of G-100, N-105 and Q-85.

IX. Determination of Occupational Aptitude Pattern

The relationship between OAP-9, of the existing 35 OAP's, and the criterion for the experimental sample was not significant. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.